INVENTIONS & INNOVATION

Success Story

THE SOLAR SKYLITE WATER HEATER

Benefits

- Uses solar energy instead of fuel or electricity to heat hot water
- Has saved over $670,000 in avoided electricity purchases
- Has saved over 3 thousand tons of avoided CO_2 emissions because solar energy avoids the harmful emissions of electricity generation
- Saves about 10 million Btu per year for a typical home
- Has saved .05 trillion Btu from 1993 through 2000 from all installations
- Potentially could save a cumulative total of 0.2 trillion Btu nationwide through 2010

Applications

Rooftop solar collection system for hot-water heating.

Capabilities

- Offers a choice of closed loop and freeze protection systems.
- Covers from 50% to 90% of hot water use.
- Emulates a skylight in appearance and construction.
- Works in conjunction with the existing hot water heater, so hot water is available on cloudy days or during high levels of hot water use.
- The attractive design is available in colors and is an architectural enhancement.

Hot Water On Demand From Lightweight, Low-Cost Rooftop Collector

A large amount of nonrenewable energy is consumed in the United States in producing on-demand hot water. The residential and commercial sectors combined use 3 quads (quadrillion Btus) of energy per year for heating water, roughly 3% of the total U.S. energy consumption. Solar energy is a clean and efficient source of heat for hot water, but consumers are hesitant to use it. Solar water heating systems require a high initial investment and are thought to be expensive to maintain, difficult to install, aesthetically unattractive, and susceptible to freezing.

With a grant from the United States Department of Energy's (DOE's) Inventions and Innovation Program, inventor Al Rich of American Solar Network, Ltd., developed the Solar SKYLITE® water heating system. The low-cost and low-maintenance system looks like an attractive skylight. The plastic panel glazings means the panels are very light and relatively easy to install and remove. The newest version of the SKYLITE is called the Fireball 2001®. The Fireball 2001 is manufactured by SolarRoofs.com, a wholly owned subsidiary of ACR Solar International Corp., and marketed by AnuPower Corp.

Technology Description

The Fireball 2001 rooftop solar collector comes in single, 12-foot units and two easy-to-connect six-foot sections using a patented technique that allows it to be shipped by regular mail services. Each collector weighs less than 38 pounds, is only 20 inches wide, and can be easily carried under the arm.

Rooftop Collector for Solar Hot-Water Heater

The collector uses a high-performance copper absorber plate to heat the water. The inside walls of the collector feature a high-emissivity white coating that reflects otherwise lost heat back onto the absorber. Of the 5 models, three are open loop and two are freeze-proof closed loop. A pump 12-volt snap switch, photovoltaic power or 110 volt differential controller circulates the heated water to the existing hot water heater. Water can be easily drained out of the collectors, thereby preventing the water from freezing in the exposed pipes during cold weather.

System Economics and Energy Savings

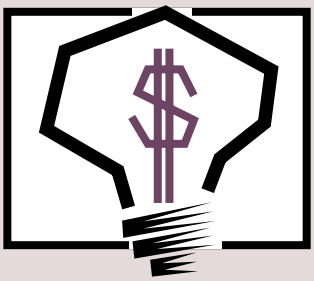
Over 1,000 systems have been sold to date. Estimated energy savings for a family of four is about 10 million Btu per year which represents an annual energy savings from all installations of 0.01 trillion Btu. From 1993 through 2000 the cumulative savings was almost .05 trillion Btu representing $670,000 in avoided electric purchases. The associated cumulative reduction in CO_2 emissions was over 3 thousand tons. A SKYLITE system based on the patented "MegaMat" is under development and will be introduced soon. Sales of the rooftop collectors are rapidly increasing, and production capability is being increased to allow many thousands of units to be manufactured per year. At a 20% growth rate, the technology could save a cumulative total of 0.2 trillion Btu nationwide through 2010.

The system can be installed in a few hours because components are pre-assembled. Retail prices range from $995 for the basic open-loop kit to $3,100 for a deluxe four-collector with photovoltaic-powered pump. Most homeowners install the system themselves, so installation costs are minimal.

The payback period for the system ranges from 3-6 years. For example, in Phoenix, Arizona, a family of four could save over $266 per year with only one panel. Because Arizona provides a 25% tax credit, the system will cost under $750 after the credits and pay for itself in 3 years. Without the credits, most installations pay for themselves in under 6 years.

Inventions and Innovation Program

The Inventions and Innovation Program provides financial assistance for establishing technical performance and conducting early development of innovative ideas and inventions. Ideas that have a significant energy-savings impact and future commercial market potential are chosen for financial support through a competitive solicitation process. Inventions funded by the program have saved enough energy to light 10 million homes per year. In addition, the program offers technical guidance and commercialization support to successful applicants. Ideas that benefit the Industries of the Future, designated by the Office of Industrial Technologies as the most energy-intensive industries in the United States, are especially encouraged.



" The I&I grant allowed me to develop an upgraded prototype with a greatly improved drainback tank."

– Al Rich
inventor
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(now at SolarRoofs.com)
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